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ABSTRACT

Student level factors influencing the employability of technical and further education (TAFE) graduates over time were examined. Student Outcomes Survey (SOS) data were collected from 4,673 South Australian 1998 TAFE graduates and 2,819 South Australian 1999 TAFE graduates. Some students were employed (part time or full time), whereas others were unemployed. Some were employed before starting the course, some were also employed during the course, and some were unemployed. The data sets were subjected to partial least squares path analysis. The analysis established that those more likely to be employed after graduation from TAFE were the following: students who began the TAFE course while still enrolled in secondary school or within 12 months after leaving school; students who were employed before starting the course; graduates who provided vocational reasons for taking the course; students who were employed during the course; and graduates who received higher qualifications from the course. Employment status before and during TAFE training was thus a strong factor influencing employment status. Although the weakest effect for both groups was qualification from the course, the higher qualification proved better for employment. The qualifications received from TAFE produced the best employment results when supported by work experience during and/or before training. (Contains 19 references.) (MN)

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Student level factors that influence the employability of TAFE graduates over time: a partial least-squares analysis

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The Australian vocational education and training (VET) courses are designed to meet the skills of industry and employability of students. While many students are unemployed before commencing their study, the nature of technical and further education (TAFE) is such that most students are employed and/or seek part time employment during their period of study. Nevertheless, after graduation from TAFE some will be in jobs while others will not - and some will have moved to better jobs.

In 1999, AC Nielsen Research collected Student Outcomes Survey (SOS) data from 4673 South Australian 1998 TAFE graduates on behalf of the National Centre for Vocational Education Research (NCVER), who manage a program of satisfaction and destination surveys. In addition, in 2000, NCS Australasia also collected SOS data from 2819 South Australian 1999 TAFE graduates on behalf of NCVER. Among these completing students, some were employed (part time or full time) whereas others were unemployed. Some of the students were employed before starting the course while some were also employed during the course, and the remaining graduates were unemployed.

Thus, the main purpose of the present study is to identify whether or not the student level factors that influence the employability of 1998 VET graduates are similar to that of the 1999 VET graduates. The data employed for the study are the 1999 and 2000 South Australian SOS data mentioned above. In this paper, partial least square path analysis methods are employed to examine student level factors that influence employability of students after graduation from TAFE over time using the partial least squares path analysis (PLSPATH) 3.01 (Sellin 1990) computer program. Conclusions are drawn about the student level factors that influence the employability level of students.

Factors influencing employability of students

The main purposes of TAFE courses are to prepare people for employment. Thus, in general, students after completing their TAFE courses are employed in the areas in which they were trained. However, completing a course or graduating from TAFE does not guarantee employment by itself. Previous research findings have indicated that many different factors influence the employability of TAFE graduates. One of the factors that is believed to influence employment is the qualification obtained. The understanding is that students will be employed if they graduate from TAFE. However, previous research findings do not support this assumption. Harris (1996) has studied the probability of employment within the youth labour market. The findings show that school leavers who completed Year 12 are much more likely to be employed than those who go on to obtain a trades qualification. In addition, Wooden (1999) contends that multivariate studies of employment status reveals that on balance, trades qualifications do not confer much in the way of an employment advantage.

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The other factor that influences TAFE graduates' employability is employment before the training. Previous research findings show that students who were unemployed before attending the TAFE course were less likely to be employed after completing their course. In their survey study of students who completed Bachelor Degree and Associate Diploma courses in 1995 from Victorian Universities and TAFE institutes, Teese and his colleagues (1998, p 16) have suggested that, '... it is frequently ineffective attempting to correct unemployment or to enter employment from outside the labour force by training in the TAFE sector'.

Kinnaird (1998, p 8) has reported that employment outcomes before the course for people who did information technology courses in 1996 in New South Wales (NSW) TAFE and who were unemployed in the six months before starting the course were very unfavourably placed. He found that the proportion unemployed after completing the course was double the NSW TAFE average for people with this background (ie 35% vs 18%).

Previous research findings have also shown that persons of Aboriginal descent were less likely to be employed when compared with those of non-Aboriginal descent (Castle and Hagan 1984; Cousins and Nieuwenhuysen 1983; Miller 1989; Ross 1987). However, after controlling for the effects of education, Harris (1996) found that those of Aboriginal descent did not appear to be disadvantaged.

Harris (1996) has also reported that disabled persons were significantly and similarly disadvantaged in the workplace, when compared with non-disabled persons.

Furthermore, Fan and Antoine (1999) have found a significant difference in employment destination between graduates with English-speaking and non-English speaking backgrounds. These authors reported that graduates from English-speaking backgrounds were more likely to be employed either full time or part time than their colleagues with non-English speaking backgrounds. This finding was consistent with those of Jones (1992), McAllister (1986) and Tiggemann and Winefield (1989). The study indicated that even if all the graduates held Australian tertiary qualifications, language background still played a role in gaining employment.

Data collection

In this study, two data sets collected at different occasions are used for analysis. The first data set includes 4673 students who attended a TAFE institute in South Australia and who completed a Certificate, Advanced Certificate, Associate Diploma, Diploma, Advanced Diploma or a Bachelors Degree of at least 200 hours or one semester in duration in 1998. The second data set includes 2819 students who attended a TAFE institute in South Australia and who completed at least one of the above-mentioned qualifications in 1999 and had an Australian address as their usual address. The data sets were collected in 1999 and 2000 respectively.

The AC Nielsen Research (1999) report states that for the 1999 data set, the survey involved sending a questionnaire to all 1998 graduates. The NCS Australasia (2000) report states that for the 2000 data sets, the survey involved sending a questionnaire to a stratified, randomly selected sample of 1999 TAFE graduates. On both occasions the survey was employed to measure VET students' employment, further study

destinations, and opinions of the training undertaken (AC Nielsen Research 1999; NCS Australasia 2000).

The present study is a secondary analysis using part of these data to identify and compare the student level factors that influence the employability of the 1998 and 1999 South Australian TAFE graduates. This analysis goes beyond the initial objectives of those who collected the data.

Method

From the findings of previous research, a model of student level factors influencing employability of South Australian TAFE graduates was developed. The PLSPATH procedure (Sellin 1990) was chosen as an appropriate multivariate technique to examine the hypothesised model.

Significance test

In the final structure of the model, it was decided that when the value of the direct path was less than twice its standard error, the path should be removed (Falk and Miller 1992). This involves the assumption that the path coefficient is actually zero when it is smaller than twice its standard error. In addition, it was recommended that a direct path with $\beta<0.07$ should be removed, because such values would show an insignificant effect in the estimation of a relationship between two latent variables (LVs). Hence, the larger the β value the larger the effect in the path model. This estimation process was repeated successively until all nonsignificant paths had been removed.

The other criterion used to assess the strength of the final path model was the maximum variance (R^2) of the outcome variable *Employment after training (EMPL_A)*. The value of R^2 gives the maximum variance explained of a construct when the preceding predictor variables are included in the analysis. Thus, the larger R^2, the more of the variance is explained.

The modification, trimming or deletion of variables and paths in the path model involves the removing of all paths not contributing to the LVs. With the use of the trimming procedure, some latent variables were removed from further analysis.

Results of the PLSPATH analysis

The first part of this paper discusses the results obtained when the hypothesised model was tested by employing PLSPATH in the analysis of data from the 2000 South Australian SOS Study. The second part of the paper compares the student level factors that influence the employability of South Australian TAFE graduates on different occasions.

Table 1: SOS 2000 - inner model jackknife results

Variable	JknMean	JknStd	Direct	Indirect	Total	Corr
R^2						
EMPL_A						
.29						
GENDER	-	-	-	-.02	-.02	-.07
STUDAGE	-	-	-	.07	.07	.009
RACE	.07	.02	.07	.05	.12	.14
C_BIRTH	-	-	-	-.09	-.09	-.11
LANGHOME	-	-	-	.03	.03	.13
DISABLED				.07	.07	.13
HSSQ_COM	-	-	-	.01	.01	.06
QUAL_B	-	-	-	.06	.06	.04
STATUS	.10	.02	.10	-.07	.03	-.0007
STUDY_B	-	-	-	-.002	-.001	-.03
EMPL_B	.23	.02	.23	.17	.40	.38
REASON	.10	.03	.10	.03	.14	.19
EMPL_ONC	.36	.01	.36	-.003	.35	.48
QUAL_C	.02	.01	.02	-	.02	.13

JknMean = Jackknife mean
JknSE = Jackknife standard error

Table 1 shows the inner model results for the PLSPATH analysis for the South Australian 2000 SOS data set. Fifteen LVs were hypothesised to influence the outcome variable *employment status at 26 May 2000.*

EMPL_A (employment status at 26 May 2000)

The employment status of VET graduates at 26 May 2000 was hypothesised to be influenced by 15 LVs. The result of the PLS analysis reveals that five of the 15 factors influence *Employment status at 26 May 2000* both directly and indirectly, while six other factors influenced *EMPL_A* indirectly (see Table 1). One factor, *QUAL_C,* shows a direct effect, while the *LOCATION* factor does not show any effect on the outcome variable. The six factors that have a direct influence on *EMPL_A* are: *RACE, STATUS, EMPL_B, REASON, EMPL_ONC* and *QUAL_C.*

Direct effects

The seven factors that have a direct influence on employment status after graduation are discussed in greater detail as follows.

RACE (Aboriginality)

RACE indicates a total effect of 0.12 on *employment after graduation.* The results of the analysis reveal that students of non-Aboriginal descent are more likely to be employed after graduation than students of Aboriginal descent.

STATUS (best description by student of status when starting the course)

This is a LV that influences *employability* of students directly (0.10) and indirectly (-0.07). The total effect (0.03) indicates that students who are still enrolled at secondary

schools or who start the course within 12 months after leaving secondary school are more likely to be employed after they graduate from TAFE than students who begin more than 12 months after leaving school.

EMPL_B (employment before the training)

This LV influences *employment status after training* directly (0.23) and also has a sizeable indirect effect (0.17). It is the strongest (0.40) variable that has both direct and indirect effect on *employment status after TAFE graduation* (see Table 1). The evidence shows that students who are employed before they start their TAFE training are likely to be employed after graduation.

This finding is consistent with previous research findings. In their survey study of students who have completed bachelor degrees and associate diploma courses in 1995 from Victorian Universities and TAFE institutes, Teese et al (1998) have reported that TAFE graduates who are employed before their training have a much greater likelihood of being employed after completion of their course than their colleagues who were unemployed before the course.

Furthermore, Kinnaird (1998) has reported that employment outcomes for people who took information technology courses in 1996 in NSW TAFE and who were unemployed in the six months before starting the course were particularly unfavourable. Kinnaird has also reported that the proportion unemployed after completing the course was double the NSW TAFE average for people with this background (ie 35% vs 18%).

REASON (reason for doing the course)

This LV influences *employment after graduation* both directly (0.10) and indirectly (0.03). The total effect is 0.14; it is the third strongest variable that has both direct and indirect effects on *employment status after graduation* (see Table 1). The evidence shows that students who express more vocational reasons for studying the TAFE course are more likely to be employed after graduation than students who express non-vocational reasons.

EMPL_ONC (*employment status during the final semester of the course)*

This LV influences the employment status of TAFE graduates both directly (0.36) and indirectly (-0.003). The total effect is 0.35. It is the second strongest variable next to EMPL_B to influence *employment status after graduation.* This result indicates that TAFE graduates who are employed during their training time are more likely to be employed after graduation than graduates who are unemployed during their course of study. The effect of *EMP_B* and *EMPL_ONC* on *EMPL_A* reveals that students in order to get a job should have some kind of work experience before the course and/or during their training period.

QUAL_C (level of qualification received by the students for the course)

This variable indicates that students who receive the highest qualification, such as a diploma or associate diploma from the course, are likely to be employed after they graduate from TAFE than students who receive the lowest qualifications such as Certificate I. However, it is important to observe that this effect is a weak effect with only a direct influence on *employment status after graduation,* and is only included in the analysis in order to test for and examine its direct effects. This implies that the

variable is not greatly helping students to be employed after graduation. This finding is consistent with previous studies. Brooks and Volker (1985) show that trades-qualified males do not have employment probabilities that are higher than males who left school at the age of 16, 17 or 18 years. Furthermore, these authors have reported that trades-qualified females actually do worse than their early school leaver colleagues. Inglis and Stromback (1986) have reported similar findings. Furthermore, Harris (1996) has reported that school leavers who completed year 12 are much more likely to be employed than those who go on to obtain a trade qualification. Recently, Wooden (1999, p 10) has reported that people who received trades qualifications do not confer much in the way of an employment advantage.

Therefore, this finding indicates that TAFE qualifications without previous work experience are not likely to be a key factor in entering employment.

Indirect effects

The seven factors that have indirect influences on employment status after graduation are discussed as follows.

GENDER (sex of the student)

GENDER shows an indirect (-0.02) effect on *employment after graduation* operating through *REASON* and *QUAL_C*. This result indicates that male students are more likely to be employed than female students (see Table 1).

STUDAGE (age of the student)

STUDAGE also shows an indirect (0.07) effect on *employment after graduation* operating through *EMPL_ONC* and *QUAL_C*. This result indicates that older students are more likely to be employed than younger students (see Table 1).

DISABLED (disability)

This is a LV that influences *employability* of students only indirectly (0.07). This variable indicates that non-disabled students are more likely to be employed after they graduate from TAFE than students with some kind of disability.

C_BIRTH (country of birth)

This LV influences the employment status of TAFE graduates indirectly (-0.09). This indirect effect indicates that Australian-born TAFE graduates are likely to be employed after graduation when compared with non-Australian born graduates. This finding is consistent with previous research findings reported by Brooks and Volker (1983) and Inglis and Stromback (1986). The authors found that country of birth had significance influence on employment outcomes. In the present study, country of birth does not show a direct effect, however, the indirect effect is stronger than the direct effect of a qualification from the course.

LANGHOME (language spoken in the home)

Language spoken in the home influences employability of students after graduation. The indirect effect is 0.03. This effect indicates that graduates who speak English in their homes are more likely to be employed after graduation than those who speak a language other than English. This finding is consistent with those reported by Fan and Antoine (1999), Inglis and Stromback (1986), Jones (1992), McAllister (1986) and

Tiggemann and Winefield (1989). Fan and Antoine have reported that even if all the graduates hold Australian tertiary qualifications, language background still plays a role in gaining employment. In the present study, language does not show a direct effect, however, the indirect effect is stronger than the direct effect of a qualification from the course.

HSSQ_COM (highest secondary school completed before the course)

HSSQ_COM (0.01) influences the outcome variable only indirectly through *QUAL_C*. The result indicates that students who have completed year 12 before the course are more likely to be employed than students who do not complete year 12 (see Table 1).

QUAL_B (level of educational qualification before the course)

QUAL_B also shows an indirect (0.06) effect on *employment after graduation,* operating through *EMPL_B* and *QUAL_C*. The result indicates that students who received educational qualifications before the course are more likely to be employed than students who did not receive any educational qualifications before the course (see Table 1).

STUDY_B (study during six months before starting the course)

STUDY_B also shows an indirect (-0.002) effect on *employment after graduation,* operating through *QUAL_C*. The result indicates that students who did not study in the six months before starting the course are more likely to be employed than students who did (see Table 1).

The only variable that does not show either direct or indirect effects is the place where students are living; that is, whether the student *lives in a capital city or other area* (*LOCATION).*

Discussion

Among the 15 LVs hypothesised to influence the employability of the South Australian 1999 TAFE graduates, only six variables showed a direct influence on the outcome variable. The variables that showed a direct influence on *EMPL_A* are *RACE, STATUS, EMPL_B, REASON, EMPL_ONC* and *QUAL_C*. One other factor, namely *LOCATION,* did not show either direct or indirect influence on the outcome variable, whereas the remaining seven variables showed an indirect influence on the outcome variable.

Comparisons between different occasions

Table 2 presents the direct and indirect effects of LVs identified as student level factors that influence the employability of TAFE graduates on the different occasions. The first column shows the variables, while the remaining columns show the direct, indirect and total effects of each variable on employability on each occasion. The direct effects of each variable on the outcome measure *employability* were considered to indicate the relative strengths of the factors that influence *employability* on the different occasions.

Gender

Gender was considered to be a factor that would influence *employability* of the 1998 and 1999 South Australian TAFE graduates data sets. However, *GENDER* showed

weak indirect effects for both data sets. The effect of *GENDER* on the outcome variable for both data sets showed that male students are more likely to be employed after graduation than their female colleagues. However, it is important to observe that the influence of *GENDER* is decreasing from -.06 (1998) to -.02 (1999).

Student age

Student age was considered a factor that would influence *employability* of the 1998 and 1999 South Australian TAFE graduates data sets. However, the variable showed indirect effects for both data sets. The indirect effect of *age* on the outcome variable for both data sets showed that older graduates are more likely to be employed after graduation than their younger colleagues.

Race

Whether the graduate is of Aboriginal descent or not was considered a factor that would influence *employability* of the 1998 and 1999 South Australian TAFE graduates data sets. This variable showed both a direct and indirect effect for the 1999 TAFE graduates. The total effect was small, however; the same variable showed only an insignificant indirect effect for the 1998 TAFE graduates' data set. The effect of *RACE* on the outcome variable for both data sets showed that students of non-Aboriginal descent are more likely to be employed after graduation than their colleagues of Aboriginal descent. However, it is important to observe that the influence of *RACE* is increasing, from an insignificant indirect effect in 1998 to direct and indirect effects in 1999. This change from indirect to both direct and indirect effects warrants further investigation.

Country of birth

The country where a graduate was born had both direct and indirect effects for the 1998 TAFE graduates. The total effect was small, however. The same variable showed an indirect effect for the 1999 TAFE graduates' data set. The effect of this on the outcome variable for both data sets showed that Australian-born graduates are more likely to be employed after graduation than non Australian-born graduates. However, it is important to observe that the influence of *country of birth* has declined from a direct effect in 1998 to an indirect effect in 1999. While this change from a direct to an indirect effect shows that the importance of the variable as a factor is declining, the difference between the total effects of both data sets is almost the same (only .02). Therefore, the variable warrants further investigation.

Table 2: Comparisons of student factors that influence employability of TAFE graduates on different occasions

Variable	Effects of the 1999 data			Effects of the 2000 data		
Name	Direct	Indirect	Total	Direct	Indirect	Total
Gender	-	-.06	-.06	-	-.02	-.02
Student age	-	.08	.08	-	.07	.07
Aboriginal descent	-	.006	.006	.07	.05	.12
Country of birth	-.08	-.03	-.11	-	-.09	-.09
Language spoken in the home	-	.03	.03		.03	.03
Disability	.09	.04	.13	-	.07	.07
Location	-	-.02	-.02	-	-	-
High school completion	-	-.05	-.05	-	.01	.01
Qualification before the course	-	.08	.08	-	.06	.06
Status before the course	.07	-.05	.02	.10	-.07	.03
Study before the course	-	-	-	-	-.002	-.002
Employment status before the course	.14	.21	.35	.23	.17	.40
Reason for doing the course	.11	.04	.14	.10	.03	.14
Employment status during the course	.42	-	.42	.36	-.003	.35
Qualification received from the course	.02	-	.02	.02	-	.02

Language spoken in the home

The language spoken in the home by the graduate was considered to be a factor that would influence *employability* of the 1998 and 1999 South Australian TAFE graduates. This variable shows only indirect effects for both data sets. These indirect effects on the outcome variable for both sets show that students who speak English in the home are more likely to be employed after graduation than students who speak a language other than English.

Disability

Whether the graduate has some kind of disability or not was considered to be a factor that would influence *employability* of the 1998 and 1999 South Australian TAFE graduate data sets. However, this variable shows direct and indirect effects for 1998 graduates and only an indirect effect for 1999 graduates. The effect of *disability* on the outcome variable for both data sets shows that non-disabled students are more likely to be employed after graduation than their disabled colleagues.

Location

Whether the graduate is living in a capital city or not was considered a factor influencing *employability* of the 1998 and 1999 South Australian TAFE graduates. This variable shows an insignificant indirect effect only for the 1998 data set. However, the variable did not show any effect for the 1999 TAFE graduates. This indicates that there is no difference between graduates from capital cities and those from other areas to be employed after graduation. Therefore, the area where the graduate lives should no longer be considered a factor that influences the employability of the South Australian TAFE graduates.

Highest secondary school completion

Although whether the student completed Year 12 before starting the course or not was predicted to influence *employability*, the variable shows an insignificant indirect effect for the 1998 and 1999 data sets.

The level of qualifications received before the course

The level of qualifications received by the student before starting the course had an indirect effect for both data sets. The effect of *level of qualifications received before the course* on the outcome variable for both data sets showed that students who received qualifications (such as bachelor degree or higher, advanced diploma or diploma), are more likely to be employed after graduation than their colleagues without any qualifications before the course.

Best description by student of status when starting the course

The description by student about his/her status when starting the course had both direct and indirect effects on the outcome variable *employability* for both data sets. The total effects indicate that students who began while still enrolled at secondary school or within 12 months after leaving are more likely to be employed after they graduate from TAFE than students who enrolled more than 12 months after leaving secondary school.

Study during six months before starting the course.

Whether the student was studying six months before starting the course had a trivial indirect (-0.002) effect on the outcome variable *employability* for the 1999 data set only.

Employment status before starting the course

The employment status of the student before starting the course had both direct and indirect effects on the outcome variable *employability* for both data sets. This indicates that students who are employed before starting the course are more likely to be employed after they graduate from TAFE than students who were unemployed.

Reason for doing the course

The student's reason for doing the course had both direct and indirect effects on the outcome variable *employability* for both sets. Thus, students who did the course for vocational reasons are more likely to be employed after they graduate from TAFE than students who did the course for non-vocational reasons.

Employment status during the course

The employment status of the student during the course showed only a direct effect for the 1998 data set, but had both direct and indirect effects on the outcome variable *employability* for the 1999 set. However, the indirect effect for the 2000 data set was trivial. The total effects for both data sets indicate that students who are employed during the course are more likely to be employed after they graduate from TAFE than students who are unemployed during the course.

Qualification received from the course

The level of qualification received from the course was considered a factor that would influence *employability* of the 1998 and 1999 South Australian TAFE graduate data sets. The variable shows only direct effects for the data sets. However, the values for these direct effects were trivial. The total effects indicate that students who have received a higher level of qualification from the course are more likely to be employed after they graduate from TAFE than students who have received a lower level.

Similarities and differences between the 1998 and 1999 data sets

Among the 15 LVs hypothesised to influence the *employability of South Australian TAFE graduates*, five factors influenced the outcome variable in both 1998 and 1999. These variables were: *best description by student of status when starting the course; employment status before the course; reason for doing the course; employment status during the course;* and *qualifications received from the course* (see Table 2). Consequently, the findings of this investigation indicate that students who are still enrolled at secondary schools or who begin the course within 12 months of leaving secondary school, students who are employed before starting the course, students who provide a vocational reason for doing the course, students who are employed during the course and graduates who received higher qualifications from the course are likely to be employed after graduation.

The differences between the 1998 and 1999 TAFE graduates were in *Aboriginality, Disability, Country of birth, Location* and *Study before the course*. For the 1998 TAFE graduates, *RACE* showed a trivial indirect effect on the outcome variable, but showed a marginal direct effect for the 1999 graduates. *Disability* showed a direct and indirect effect for the 1998 graduates, however its contribution was reduced to a direct effect for the 1999 set. *Country of birth* showed both direct and indirect effects and was considered a factor for the 1998 TAFE graduate data set, however its contribution was reduced to an indirect effect for the 1999 data set. In addition, *LOCATION* showed an indirect effect in the 1998 data set, but did not show any effect for the 1999 TAFE graduates. Furthermore, *Study six months before starting the course* showed a trivial indirect effect in the 1999 graduates data set, but did not show any effect for the 1998 graduates.

Conclusions and recommendations

The results of the path analyses for the two different data sets (1998 and 1999 TAFE graduates) have revealed that students who begin the course while still enrolled at secondary school or within 12 months after leaving school, students who are employed before starting the course, graduates who provide vocational reasons for doing the course, students who are employed during the course and graduates who received higher qualifications from the course are likely to be employed after they graduate from TAFE.

Employment status before and during the training is a strong factor influencing employment status. While the weakest effect for both groups is qualification from the course, the higher qualification is better for employment. The qualifications received from TAFE produce the best employment results when supported by work experience during and/or before training. Further study is necessary to identify the factors that influence employment status of TAFE graduates over time. In addition, further work is required to study these processes by the investigation of subgroups undertaking specific courses, to examine whether similar processes are operating in similar ways for these different subgroups.

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